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Influence of Nicotine on the Release of Acetylcholine in the Human Placenta and its Implications on the Fetal Growth.

Recent surveys indicate that babies of women who are habituated to smoke tobacco are smaller in size than those of nonsmokers. Further recent studies indicate that nicotine releases acetylcholine (ACh) from presynaptic nerve terminals and synaptosomes. In view of these observations, one could anticipate that nicotine can release more than the normal quanta of ACh from its stores in the villous epithelium. Released ACh (and/or nicotine) may influence the transport of energy metabolites across the trophoblast. The final result would be fetal deprivation and relatively poor fetal growth. At the present time, it is not possible to assess whether the final effect is due to released ACh or nicotine or both.

The aims of this project are: (1) to study the effects of nicotine on the release of ACh from human placental villi and to establish relationships between the dose of nicotine and ACh released into the medium (or ACh retained in villi); (2) to separate the ACh granules from placental tissue by density gradient separation, and to study the mechanisms of ACh release from granules by nicotine; (3) to obtain evidence for the presence of a cholinergic receptor in the human trophoblast where nicotine binds for exhibiting agonistic or antagonistic effects; and (4) to set up a perfusion system for human placenta for use in the investigators' laboratories.

The existence of an ACh-choline acetylase-acetylcholinesterase-like system in human placenta was demonstrated in the researchers' laboratories. In view of this, the above specific aims will be pursued in the immediate future.

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